Farnell

E.30/2

STABILISED POWER SUPPLY UNIT.

INSTRUCTION BOOK

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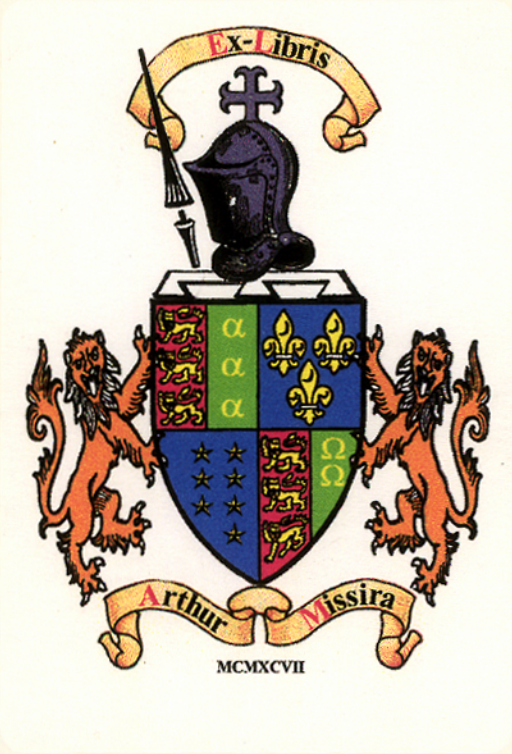
E.30/2

STABILISED POWER SUPPLY UNIT.

FARNELL INSTRUMENTS LIMITED,
SANDBECK WAY, WETHERBY, YORKSHIRE. LS22 4DH.

TELEPHONE: WETHERBY 0937 3541-6.

C O N T E N T S.



SECTION 1.

INTRODUCTION.

The stabilised voltage supply type E.30/2 is designed to provide a d.c. stabilised voltage which is variable from 0 to 30 volts at a maximum current of 1 amp, or 0-15 volts at a maximum current of 2 amps.

The voltage output range is selected by a front panel switch, giving full control from 0-15V or 0-30V as selected. Coarse and fine adjustments are provided by means of the control potentiometers on the front panel.

The output voltage or current is monitored by a switched voltmeter/ammeter, voltage or current range being selected by a front panel switch.

These units are designed to operate in ambient temperatures of up to 45 degrees centigrade.

Overload protection is provided to protect the power unit against progressive and sudden overloads. The protection circuit is automatically reset on removal of the overload.

The instrument will operate from mains supplies of 220 and 240V a.c. 50/60 c/s.

SECTION 2

OPERATING INSTRUCTIONS.

1. PREPARATION FOR USE.

Units are normally supplied for 240V operation.

For 220V mains input, the link on the transformer tag board should be changed to the appropriate position.

The mains lead is wired as follows:

Brown	-	Mains live
Blue	-	Mains Neutral
Green/Yellow	-	Earth

The voltage required is set by the range switch and the fine and coarse controls.

2. METERING.

A dual range meter is fitted to monitor either output voltage or current.

The required range is selected by a push button switch on the front panel marked:- Meter - Volts/Amps.

3. OVERLOAD PROTECTION.

The current limiting facility is designed to protect the power unit and is preset to approximately 110% of the maximum current on each range.

In operation the circuit limits the current that may be drawn from the unit. With progressive overload the voltage at the output falls while the current remains approximately constant.

On removal of overload the output will reset to its original voltage.

4. FUSES.

The mains input circuit and regulated output circuit are each protected by fuses, which are accessible on the back panel of the unit.

NOTE: BEFORE REMOVAL OF MAINS FUSE ENSURE MAINS SUPPLY IS DISCONNECTED.

5. ON/OFF SWITCH AND INDICATION.

When the mains supply is switched on by the ON/OFF push button switch on the front panel, the presence of supply voltage is indicated by the front panel neon lamp.

NOTE: Illumination of the neon does not indicate that the mains fuse has not blown.

SECTION 3.

CIRCUIT DESCRIPTION.

1. GENERAL.

The output from the two main secondaries of the mains transformer MT1 are switched by SW2a and SW2b in series or parallel for 0-30 or 0-15 Volt operation respectively. This a.c. voltage is rectified by bridge D4 to D7 and smoothed by reservoir capacitor C3 to provide an unstabilised d.c. supply. The positive of the unstabilised supply is fed to the collector of VT6 and VT7 through R16 and R18 to the + O/P terminal. The negative of the unstabilised supply is fed through P2 to the negative output. An auxiliary supply for the stabilising circuit is obtained from the other secondary winding, which is rectified by D1 and D2 and smoothed by C1.

2. STABILISATION CIRCUIT.

Current is taken from the auxiliary supply across C1 and fed through R1 to Z1 which is the first zener diode and provides rough stabilisation. The voltage across Z1 is further stabilised by Z2, D3 and Z3 which are fed by R2. These provide the stabilised voltages for the amplifier, namely +10V (nominal) - 0.7V (nominal) and - 5.8V (nominal), which are referred to the + O/P terminal via the feedback connection. Current from the + 10V line is passed through R3 to Z4 which provides a stable reference voltage.

The reference voltage passes current down the potential divider formed by R4 and T1 and P1 and P2. (R7 and T2 shunt P1 and P2 through SW2C only in the 0-15V mode). The other end of the potential divider being connected via the negative feedback lead to the negative output. The differential amplifier formed by VT1 and VT3 senses any voltage difference between the junction of T1 and P1, and the positive output.

Thus, assuming the voltage on the output tries to rise the base of VT1 will become negative and VT1 will tend to turn off. This reduces the current through R5 and the base/emitter junction of VT2 decreasing the current through VT2 collector. This decreases the current drive into VT5 base through R8, and hence the current drive into VT6 base. Therefore the current into the output load and the voltage across it decreases. Alternatively if the voltage on the output tends to go down, the reverse process increases the O/P current and therefore the O/P voltage.

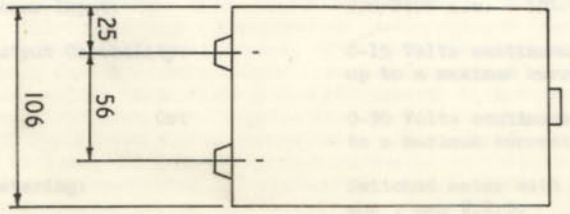
The sum effect is to keep the voltage at a value fixed by the value of P1 and P2 against all load variations. Z4 provides a stable reference against mains supply variations.

3. OVERLOAD PROTECTION.

The current through R16 gives a voltage proportional to output current. This is sensed by R9, T3 and R10. R13 provides a negative bias on the base of VT4 which is turned off in normal use. As the output current rises the voltage at the base of VT4 rises until it is positive enough with respect to VT4 emitter, which is set at -0.7V, to turn VT4 on. Drive current to the base of VT5 is then shunted through VT4 collector. This limits the maximum current available at the output. The value of current available is preset by T3. On removal of the overload VT4 is switched off and the output voltage returns to its previous level. R11 is switched to shunt R10 in the 0-15V mode, increasing the bias on VT4 base and allowing the voltage across R16, (and therefore the current through it) to rise to a higher value before VT4 is turned on.

4. METERING.

A one milliamp f.s.d. meter is used to monitor the output voltage or current. SW3 in the volts position connects the meter in series with R13 and T5, (between positive and negative output terminals). T5 is set to give f.s.d. on the meter at 30 volts. With SW3 in the current position the meter (with T4 in series) senses the voltage across R16. T4 is set to give f.s.d. on the meter with an output current of 2 amps.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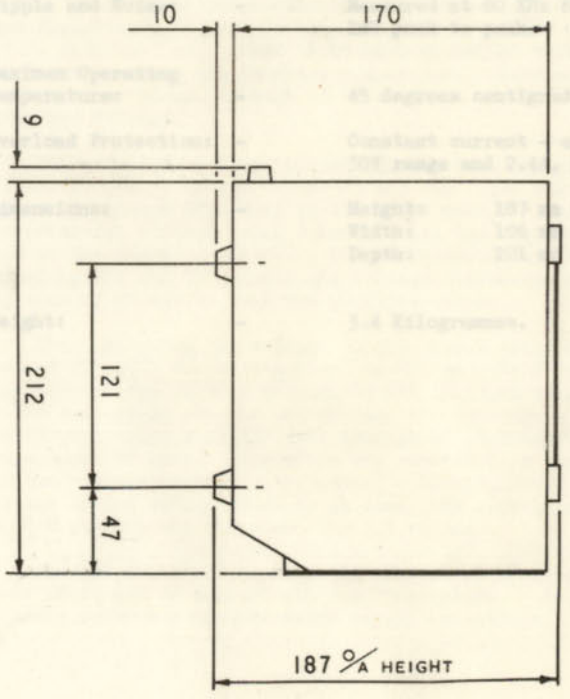
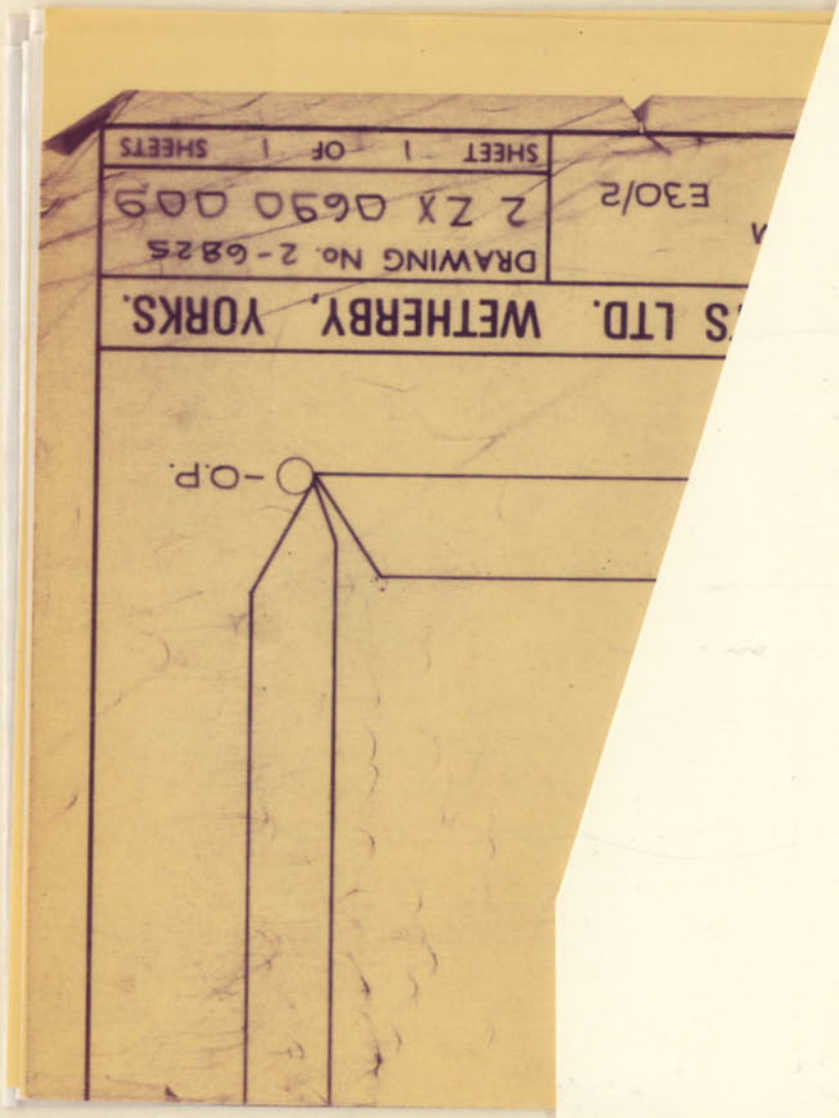
106

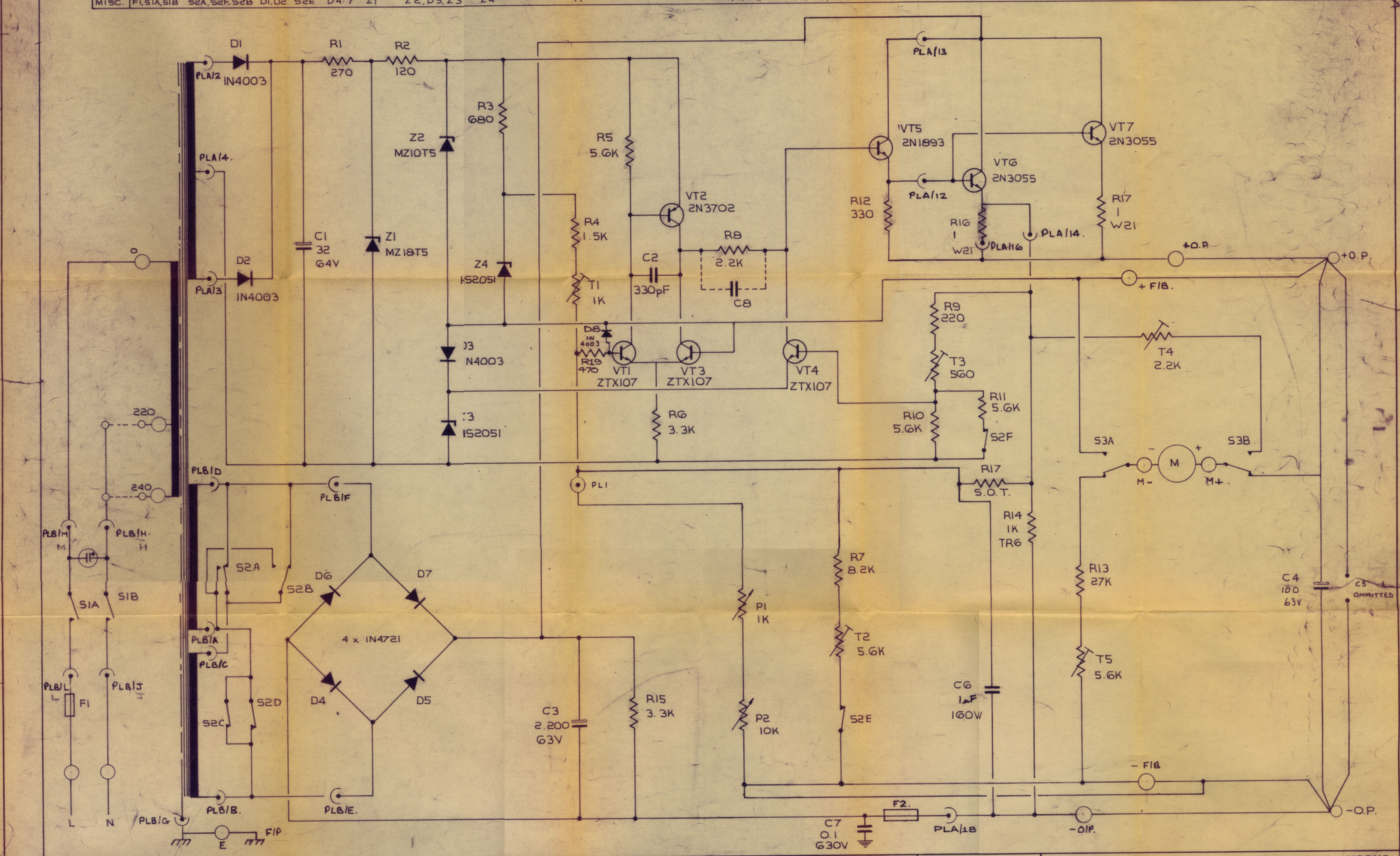

10
170
9
212
121
47
187 % A HEIGHT


O.P.
S LTD. WETHERBY, YORKS.
DRAWING No. 2-6825
2 ZX 0690 009
E30/2
SHEET 1 OF 1 SHEETS

DRAWING No. 2ZX0690009

USED ON

R	1 2 3 4 5 15 6 8 7 12 9 10 16 11 14 13 17
C	1 3 2 8 7 6 4 5
VT	1 3 2 4 5 6 7
MISC.	F1, S1A, S1B S2A, S2F, S2B D1, D2 S2E D4-7 Z1 Z2, D3, Z3 Z4 T1 P1, P2 T2, S2C T3, F2 S2D T5 S3A T4 M S3B



TRACED PMR	C	26-9-74	Q3194	D	3-12-74 Q3257
	B	20-8-73	Q2521		
CHECKED	A	7-7-72	—		
	2	20.1.72	—		
DRAWN	ISSUE	DATE	MOD. No.		
	1	31-8-71	—		

NOTE: ALL RESISTOR VALUES IN OHMS, UNLESS OTHERWISE STATED. K = 1,000 OHMS.
ALL CAPACITOR VALUES IN MICROFARADS, UNLESS OTHERWISE STATED

TOLERANCES

MATERIAL

SCALE:

PROTECTIVE FINISH

DIMENSIONS IN M.M.

NOTE: REMOVE ALL BURRS AND SHARP EDGES

FARNELL INSTRUMENTS LTD. WETHERBY, YORKS.

TITLE: CIRCUIT DIAGRAM E30/2

DRAWING No. 2-6825
2 ZX 0690 009

SHEET 1 OF 1 SHEETS

FARNELL INSTRUMENTS LIMITED - SANDBECK WAY - WETHERBY - YORKSHIRE LS22 4DH - TELEPHONE 0937 61961